

REMARKS

Reconsideration of the pending application is respectfully requested on the basis of the following particulars.

1. In the claims

As shown in the foregoing amendment to the claims, the claims have been amended to correct a minor informality.

A. Claims 1-3

Claims 1-3 remain unchanged.

B. Claims 4-7

Claim 4 is amended to correct two minor typographical errors that occurred with the last submission of the claims. Claim 4 as originally filed recited the range of “from 0.0001 to 0.01 wt% calcium” and “ $T_{Tr} = (C+0.8xSi+5xP)\dots$ ” In the response submitted on October 17, 2005, claim 4 mistakenly read “from 0.001 to 0.01 wt% calcium,” and “ $T_{Tr} = (C=0.8xSi+5xP)\dots$ ” and further did not include any punctuation indicating that these portions of the claim were intended to be changed. Accordingly, claim 4 is currently amended to place these portions of the claim in their original form, and no new matter is added. This amendment does not present any new issues, and therefore should not be barred entry. Entry for at least the purposes of appeal is requested.

Claim 6 is amended to correct a minor typographical error that occurred with the last submission of the claims. Claim 6 as originally filed recited “up to 0.3 wt% lead.” In the response submitted on October 17, 2005, claim 6 mistakenly read “up to 0.03 wt% lead” and further did not include any punctuation indicating that this portion of the claim was intended to be changed. Accordingly, claim 6 is currently amended to place this portion of the claim in its original form, and no new matter is added. This amendment does not present any new issues, and therefore should not be barred entry. Entry for at least the purposes of appeal is requested.

Claims 5 and 7 remain unchanged.

Entry of the amendment of the claims is respectfully requested in the next Office communication.

2. Rejection of claims 1-7 under 35 U.S.C. § 103(a) as being unpatentable over U.S. patent 5,769,970 (Robelet et al.) in view of “Embrittlement of Iron” (Vander Voort) and in view of Japanese patent 09-111412 (Mitsuo et al.)

This rejection is respectfully traversed on the basis that the rejection fails to establish a *prima facie* case of obviousness for the reasons discussed below.

A. None of the cited references disclose every limitation of claims 1-7

This rejection is respectfully traversed on the basis that the rejection fails to establish a *prima facie* case of obviousness because none of the cited references disclose every limitation of pending claims 1 and 4.

Pending claims 1 and 4 both require a concentration of from 0.001 to 0.01 wt% oxygen, and require a concentration from 0.0001 to 0.01 wt% calcium, all in combination with the claimed concentration of other elements. These requirements are essential to the claimed microalloyed steel. As discussed on page 14 of the specification, the calcium displaces part of the manganese in MnS to form a solid solution of calcium in MnS to improve machinability. In order to obtain the solid solution of calcium in MnS, the oxide of calcium must be present. So, the oxygen is required in order to form the solid solution of calcium in MnS in order to improve machinability.

The Mitsuo et al. patent does not disclose the use of any concentrations of calcium and oxygen in the disclosed steels.

The Robelet et al. patent does not disclose the claimed concentrations of calcium and does not disclose the use of any concentration of oxygen in the disclosed steels. The Robelet et al. patent broadly suggests treating the disclosed steels with calcium, but makes no mention of the specific claimed concentrations of calcium (col. 4, lines 18-20).

The Vander Voort reference does not disclose the use of any concentrations of calcium, or of the claimed concentration of oxygen in combination with the claimed concentration of other elements. The Vander Voort reference discusses the use of the claimed concentrations of oxygen merely in an iron-oxygen alloy, not in a microalloyed steel.

Since none of the cited references disclose in combination with the claimed concentration of other elements, a concentration of from 0.001 to 0.01 wt% oxygen, and a concentration from 0.0001 to 0.01 wt% calcium, as required by pending claims 1 and 4, a *prima facie* case of obviousness cannot be sustained. Accordingly, withdrawal of this rejection is respectfully requested.

B. None of the cited references provide any motivation or suggestion to combine

This rejection is respectfully traversed on the basis that the rejection fails to establish a *prima facie* case of obviousness because none of the cited references provide any suggestion or motivation to combine the references to obtain the claimed microalloyed steel having the claimed concentrations of calcium and oxygen.

The Mitsuo et al. patent does not discuss at all the use of calcium and oxygen in steel, and therefore can provide no motivation or suggestion to use calcium and oxygen in the claimed concentrations in the Robelet et al. patent.

There is no motivation or suggestion in the Vander Voort reference to use calcium and oxygen in microalloyed steels in the concentrations claimed.

The Vander Voort reference has no discussion regarding the use of calcium in the claimed concentrations in a microalloyed steel, and therefore can provide no motivation or suggestion to use calcium in the claimed concentrations in a microalloyed steel.

The Vander Voort reference discusses the use of oxygen in iron-oxygen alloys in order to affect the toughness of the alloy (page 1, paragraph 3). However, the Vander Voort reference discloses that in steels having carbon at a concentration of

.003, large variations in oxygen content have no influence on brittleness (page 2, paragraph 3). The Vander Voort reference therefore teaches away from adding oxygen, in the claimed concentrations, as an unnecessary additional element having no effect on the brittleness of a microalloyed steel. In view of the teachings of the Vander Voort reference, one of ordinary skill in the art would not be motivated to use oxygen in the claimed concentrations in the claimed microalloyed steel, because there would be no benefit to the addition of the oxygen.

There is no suggestion or motivation in the Robelet et al. patent to use calcium and oxygen in the claimed concentrations.

The Robelet et al. patent does not discuss at all the use of oxygen in a micorallyoed steel, and therefore, can provide no motivation or suggestion to use oxygen in the claimed concentration in a microalloyed steel.

The Robelet et al. patent discloses the optional treatment of steel with calcium, but makes no disclosure as to the amount of calcium used, or even whether the calcium becomes part of the chemical make-up of the steel. The Robelet et al. patent certainly does not suggest the claimed concentrations of calcium as part of the chemical make-up of the claimed microalloyed steel.

Since none of the cited references disclose a motivation or suggestion to use, in combination with the claimed concentration of other elements, a concentration of from 0.001 to 0.01 wt% oxygen, and a concentration from 0.0001 to 0.01 wt% calcium, as required by pending claims 1 and 4, a *prima facie* case of obviousness cannot be sustained. Therefore, withdrawal of this rejection is respectfully requested.

C: There is no reasonable expectation of success for the combination of the cited references

This rejection is respectfully traversed on the basis that the rejection fails to establish a *prima facie* case of obviousness because there is no reasonable expectation of success for combining the references to obtain the claimed microalloyed steel having the claimed concentrations of calcium and oxygen.

The Mitsuo et al. patent does not discuss at all the use of calcium and oxygen in steel, and therefore can provide no expectation of success to use calcium and oxygen in the claimed concentrations in the Robelet et al. patent.

Because the Vander Voort reference and the Robelet et al. patent do not disclose the claimed concentrations of calcium and oxygen in combination with the other claimed elements in a microalloyed steel, there is no reasonable expectation that the combination of the Vander Voort reference and the Robelet et al. patent will successfully disclose the claimed concentrations of calcium and oxygen in combination with the other claimed elements in a microalloyed steel.

Since there is no reasonable expectation of success for combining the cited references to obtain the claimed microalloyed steel having a concentration of from 0.001 to 0.01 wt% oxygen, and a concentration from 0.0001 to 0.01 wt% calcium, as required by pending claims 1 and 4, a *prima facie* case of obviousness cannot be sustained. Therefore, withdrawal of this rejection is respectfully requested.

D. Summary

In view of these comments, it is submitted that none of the cited references disclose the claimed concentrations of calcium and oxygen required by pending claims 1 and 4. It is also submitted that none of the cited references provide a suggestion or motivation to combine the references and to use the claimed concentrations of calcium and oxygen required by pending claims 1 and 4. It is also submitted that there is no reasonable expectation that a combination of the cited references will successfully describe the claimed concentrations of calcium and oxygen required by pending claims 1 and 4. Accordingly, withdrawal of this rejection is respectfully requested.

3. Conclusion

In view of the foregoing remarks, it is respectfully submitted that the application is in condition for allowance. Accordingly, it is respectfully requested that every pending claim in the present application be allowed and the application be passed to issue.

If any issues remain that may be resolved by a telephone or facsimile communication with the applicants' attorney, the examiner is invited to contact the undersigned at the numbers shown below.

BACON & THOMAS, PLLC  
625 Slaters Lane, Fourth Floor  
Alexandria, Virginia 22314-1176  
Phone: (703) 683-0500  
Facsimile: (703) 683-1080

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Respectfully submitted,



JUSTIN J. CASSELL  
Attorney for Applicants  
Registration No. 46,205